

Precious cargo

Behind the Scenes with the Human Research Facility Stowage Group

by Catherine E. Borsché

Packing for space seems simple enough – that is, to a seasoned business traveler. But for the folks who work each day in the Human Research Facility (HRF) Stowage Group, there is much more in-depth planning, practice and design that goes into packing scientific experiments for the International Space Station.

When a Space Station experiment goes on the drawing board, the HRF Stowage Group enters the design process. This Critical Design Review gives the group an opportunity to address what the needs are for that particular experiment. They use that information to design the experiment kit that will be used onboard the Space Station.

“We’ll start stowage evaluation a little bit before the Critical Design Review for a particular Space Station experiment,” Dan Barineau, project manager of the metabolic laboratory operations and stowage support group, said. “Usually by Critical Design Review, we have the design 90 percent complete, and Stowage can come in with a real cohesive assessment. They also have a good concept of how they’re going to operate the experiment on Station, which tends to impact how we stow things.”

Once the design for the Space Station experiment is in place, prototype experiments must be completed to simulate how the experiment is to be packed on the Space Station. These prototypes also serve to aid in the design of the experiment hardware. Not only does the HRF Stowage group design the kit that the experiment goes into, but they also design the actual



hardware, which can include testing implements and sample containers.

Designing prototype experiment kits requires background work. Once the engineering drawings are in place, the specifications for the experiment are used to produce the desired scale of the prototype. After that happens, the right construction materials must be selected. It is then determined which bonding processes will meet the structural requirements. When the necessary design work is finished, the parts for the prototype must be meticulously cut and assembled.

The kits, or stowage bags, are also thoroughly prototyped, usually with simple cardboard. Once all the prototyping is done, it becomes time to make the real kit for flight.

“Once the kit is assigned, we start doing the drawings, making the flight units, and then begin packaging the kit,” Silvia Flores, senior packaging engineer, said.

Making the actual kit for the experiment or hardware requires much more than just putting the items haphazardly in a stowage container. There is a lot of rhyme and reason that goes into packing a kit.

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“We are asked to make a kit in which the hardware is padded, if necessary, and limited to the size of the allotted drawer in the Space Station,” Phillip Good, metabolic laboratory specialist, said. “The kit must be user-friendly and detailed in labeling so that when the astronauts start the experiment, the labeling and the kit are matched to their procedures. Everything comes out of the kit in the most user-friendly method possible.”

Most kits designed for the Space Station are made of Nomex material and are either royal blue or white in color. The kits are typically soft and collapsible, so that when the experiment or hardware is no longer in the kit, it can be easily stored using the least amount of space possible. This is crucial for spaceflight, where stowage space is cherished.

The bags and sample containers have received rave reviews from the astronauts using them in space. Sue Dalmeida, metabolic laboratory lead, was one of the chief designers behind the renal stone experiment kit.

“The bag that they used to stow the urine trash kept things as fresh as a daisy – completely odor containing! The urine containment bag also went inside a big Nomex bag with an 11-inch heavy-duty zipper to keep everything sealed tight,” Dalmeida said.

The completion of the actual kit does not signal an end to the HRF Stowage Group’s involvement.

Flores explains that the kits have to go through a rigorous approval process. Everything about the kit is evaluated, including the way it is stowed, how it is packed, its electrical requirements and its safety components.

The process is involved, but the end product is always of the highest quality.

“We enjoy the challenge of keeping the multitude of competing requirements from destroying the final design’s usefulness to the mission,” Paul Vincent, packaging engineer, said. “The crew has limited time. It’s our job to not waste any of it while they transfer, stow, un-stow, deploy and re-stow the experiment hardware.”

Dalmeida said that in their line of work, boredom is never a problem. All experiments and stowage kits are custom-made, so each assignment is essentially a new path to tread.

“This gives you good exposure to the entire range of hardware involvement. In Stowage, you start from nothing,” Barineau said. “But in a very short amount of time, you have prototypes, developmental units, and a different, final product after you get feedback from people.”

The HRF Stowage Group continues to fill the Space Station racks with their hardware and stowage kits. Once regular Shuttle flights resume, scientific experiments such as the Muscle Atrophy Research Exercise System and Visuomotor & Orientation Investigations in Long-duration Astronauts will make their debut in orbit.



From left to right: Members of the Human Research Facility (HRF) Stowage Group, Phillip Good, Paul Vincent, Daniel Barineau, Sue Dalmeida and Silvia Flores, stand amid many hardware and stowage kit creations, models and prototypes in the Metabolic Laboratory.

Volunteers send hope abroad

OPERATION: COVER UP

by Catherine E. Borsché

IT STARTED WITH A SIMPLE LETTER published in an astronaut spouse newsletter. MaryLee Newman, living in Moscow with her husband, Astronaut James H. Newman, and their three children, volunteered her time at a government-run orphanage. While working there, she noticed the shortage of supplies such as diapers, wipes and paper towels. The heating system in the orphanage was also lacking and needed to be replaced.

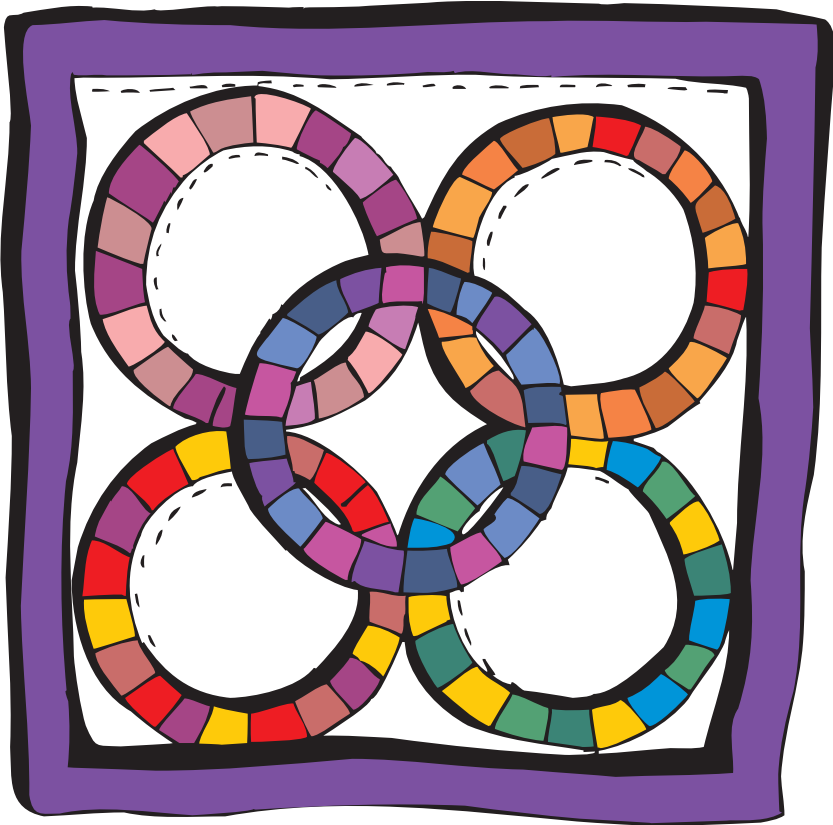
“The circumstances are difficult,” Newman said in the letter. “But the children are wonderful. They are happy, playful, quick to smile and to hold up their hands to be held.”

The nurses and staff at the Johnson Space Center Flight Medicine Clinic were stirred by the article and quick to respond.

Brenda Rouse, registered nurse in JSC’s Flight Medicine Clinic, explained how they came up with the idea of donating quilts and blankets to orphanages in Russia. “At the end of the letter, MaryLee Newman thanked Annie Bowersox and her friends in California that had made quilts for a brand new orphanage,” Rouse said. “MaryLee added that if there was a group that wanted to do this, it would be greatly appreciated. I read that and thought, you know – we could do something like that!”

“It really touched us,” Cheryl Young, JSC registered nurse, said.

Ignited with a plan appropriately called “Operation Cover Up,” the JSC Flight Medicine group banded together with members of JSC Occupational Health to pull off this humanitarian effort.



Amy Trabue, receptionist for the Flight Medicine Clinic, found directions on how to make polar fleece quilts that did not require sewing. Equipped with this knowledge, all employees could take part – even if they lacked sewing skills. Many people chose to donate money to aid in the creation of the blankets.

“We all jumped on the bandwagon and agreed to participate and support Brenda in any way we could. We wanted to give something to those little guys that we had put our hearts into, so we decided to make the blankets ourselves,” Carole Porcher, head nurse in Flight Medicine, said.



Johnson Space Center’s Flight Medicine group members Carole Porcher, Cheryl Young, Brenda Rouse and Amy Trabue pose with the 57 blankets that were hand-made for Russian orphanages in “Operation Cover Up.”

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The group purchased the materials to make the blankets. The blankets, mostly made of polar fleece, are a colorful assortment of cartoon characters and designs. Some volunteers went the extra mile to hand-crochet and sew the quilts together. The stunning assortment of 57 blankets is a testament to the hard work put forth by JSC employees.

Flight Surgeons David Alexander and Sean Roden will be traveling to Russia this month and will each take extra luggage filled to the brim with the blankets.

“I volunteered to transport the items to Russia,” Alexander said, “because there is a real need for this type of effort. I am just glad to be able to support it in some small way.”

The blankets will be appropriately stored in vacuum-sealed “space bags” prior to being packed for travel in the flight surgeons’ suitcases. Once the travel dates are picked, Flight Medicine will coordinate the blanket exchange with Newman.

The blankets were made and collected from February until the end of August. This caring venture has involved countless employees, friends and supporters – and has proven to be a resounding success.

“The amount of baby blankets we have received has surpassed our expectations,” Trabue said.

